PosiTector® *SST*

Soluble Salt Tester

Instruction Manual

For use with all **Bresle** patch types including the

Innovative **PosiPatch™**

On device display:
1 2 3
Press + for next test

t 2:23
T₂ 24.8 °C
ΔᵞY 30 µS/cm
ρₐ 36 mg/m²
3.0 ml

SST

DeFelsko®
The Measure of Quality

Introduction

The **PosiTector Soluble Salt Tester** (**SST**) is a hand-held electronic instrument that measures the conductivity of a solution and calculates the concentration of water-soluble salts on metal surfaces in accordance with ISO 8502-6 (the Bresle Method) and ISO 8502-9. It consists of a PosiTector body (Standard or Advanced) and an interchangeable probe.

The **PosiTector** *SST* is compatible with all Bresle Method-type patches including the Bresle Method DeFelsko PosiPatch, Bresle Method DeFelsko Patch and other adhesive patches. While compatible with any test patch, there are numerous advantages to the DeFelsko patch solutions.

The Bresle Method **DeFelsko Patch** is low cost, latex-free, and works on nearly any surface geometry or material. It features a low-tack adhesive which creates a tight seal while remaining easy to remove without leaving behind any foam residue.

The Bresle Method **DeFelsko PosiPatch** further simplifies the Bresle method. It requires no adhesive, as it is held to a steel surface by a magnetic holding ring. It has a built-in port which allows deionized (DI) water to be injected using a dull polypropylene dispensing tube, eliminating sharp needles from the test. It features a patented air-permeable membrane, which automatically releases trapped air as DI water is injected, then allows air bubbles to return and agitate the surface as solution is withdrawn. It is also reusable, and a single PosiPatch can be used for multiple tests.

The **PosiTector** *SST* can be used as a conventional conductivity meter making it ideal for testing abrasive materials in accordance with ISO 11127-6 and ASTM D4940-15. See **Bresle Mode** (pg. 10).

Quick Start

Press the ≡ button to power up the Gage. To conserve battery life, the gage will automatically go to sleep after 5 minutes of inactivity (15 minutes while in **Bresle Mode**, pg. 10). While in **Sleep Mode**, the gage powers up significantly faster— convenient when moving between parts or locations. The gage will completely power off after 4 hours of inactivity. Alternatively, select **Power Off** from the main menu. All settings are retained.

Menu Operation

To access the Menu, power-up the gage, then press the center navigation button ≡. Either the keypad or touch screen can be used to navigate the menu. If desired, touch screen functionality can be disabled within the Setup menu (See **Touch**, pg. 10).

Select a menu option by touching it, or use the ▲ and ▼ buttons to highlight the desired option and press ≡ to select it.

On menus longer than one page, the current page number is displayed below the menu name. Navigate between pages using ▲ when the first menu item is selected, or ▼ when the last menu item is selected. If using touch, navigate between pages by touching ← or →, or by swiping up or down.

Press the ⊖ button or swipe right to return to a previous screen. Select **Exit** to close the Menu.
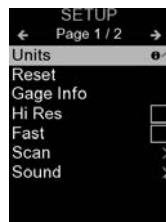
When a Menu option is highlighted, the 🛈 icon indicates on-gage help is available. Press ⊕ or touch the 🛈 icon to display the help.

Update your gage to ensure that you have the latest on-gage help information.

indicates that a sub-menu exists for the Menu option. Select the option to display its sub menu.

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Probes

When powered-up, the **PosiTector** automatically determines which probe is attached and does a self-check. To disconnect a probe from a body, slide the plastic probe connector horizontally (in the direction of the arrow) away from the body. Reverse these steps to attach a different probe. It is not necessary to power-down the Gage when switching probes.

Additionally, the **PosiTector** gage body accepts a wide variety of probe types including magnetic, eddy-current and ultrasonic coating thickness, surface profile, environmental, hardness, salt contamination, and ultrasonic wall thickness probes.

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PosiTector *SST* probes consist of a purpose-built test cell, optimized for the range, resolution and test volume of the Bresle Method. Conductivity measurements are compensated to 25°C (77°F) using a built-in temperature sensor, and the sample temperature is recorded for each measurement. The probe can be used as a conventional conductivity meter by unchecking **Bresle Mode** (pg. 10).

Test Cell

How To Measure

Test Preparation:
Use deionized (DI) water to thoroughly clean the **PosiTector** *SST* test cell, test cup, syringe and PosiPatch (if used in test).

All test materials should be handled in a manner that minimizes the potential for contamination. The **PosiTector** *SST* operator may choose to wear nitrile or other non-contaminating gloves when performing the test.

Remove the protective cap from the probe. Power-up the Gage by pressing the ≡ button. In the default **Bresle Mode**, the Gage guides you through three simple steps - 1, 2 and 3.

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**Step 1: Obtain Background (Blank) Conductivity Measurement (γ_1)**

NOTE: The Gage automatically displays the previous background measurement, if any. This measurement can be reused and step (**c**) to step (**e**) can be skipped by pressing the ⊖ button.

a) Pour at least 4 ml (milliliters) of deionized (DI) water into the supplied cup (to prevent contamination of the water source).

b) Fill the syringe completely with DI water from the cup (slightly more than 3 ml).

c) Completely fill the **PosiTector** *SST* probe's test cell with water from the syringe (approximately 1 ml).

d) Wait until the measurement stabilizes (up to 5 seconds), then press the ⊕ button to save a new background conductivity measurement (γ_1) and the water temperature (T_1).

e) Use the syringe to draw all of the water from the test cell. Shake any remaining water out of the test cell.

f) With the syringe pointing up, expel the air and excess solution from the syringe until there is 3.0 ml of DI water remaining.

Step 2: Prepare Bresle Method Patch

Option A: DeFelsko PosiPatch
a) Turn the PosiPatch and magnetic ring upside down. Place the PosiPatch into the magnetic ring ensuring the arrows align with the injection port. Do not touch the PosiPatch's interior.

b) Carefully place the magnetic ring on the steel surface. When used on vertical surfaces, position the injection port between the 4 o'clock and 8 o'clock points before attaching the magnetic ring to the surface.

c) Slowly inject 3.0 ml of DI water into the port using the plastic dispensing tip. The air within the PosiPatch automatically escapes through the air-permeable membrane.

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a)   b)   c)
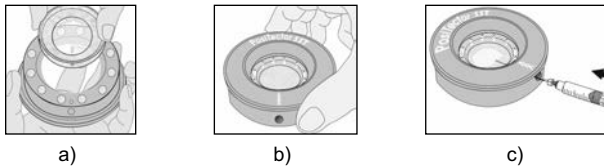
When used on horizontal surfaces, fully insert the dispensing tip into the PosiPatch. On vertical surfaces, insert the dispensing tip only as far as is needed to see the tip inside the PosiPatch.

Option B: Bresle Method DeFelsko Patch (or equivalent)
a) Remove the backing and foam center from the patch, taking care not to touch the interior surface.

b) Press the patch firmly onto the surface making sure most of the air escapes.

c) Pierce the top of the patch at the foam perimeter, allowing the needle to penetrate into the center of the patch.

a)   b)   c)
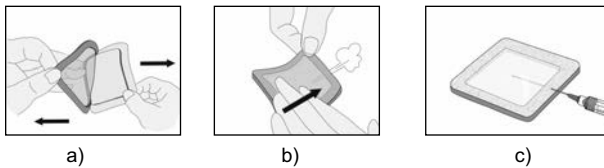
d) Inject half of the water into the patch. Then, use the syringe to withdraw trapped air.

e) Remove the needle, point it upwards and expel the air.

f) Re-insert the needle and inject the remaining water into the patch.

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Step 3: Begin Test (applies to both patch styles)

a) Once the water is injected into either patch, press the ⊕ button to start the test timer.

TIP: After starting the test timer, the operator can select **Power Off** from the Gage menu to conserve battery life. The test timer will continue to run and the elapsed test time will be displayed when the Gage is powered-up.

b) Without removing the needle/dispensing tip from the patch, use the syringe to repeatedly withdraw and inject the water. ISO 8502-6 recommends this process be completed at least four times and that the test time be agreed between interested parties. DeFelsko recommends a test time of two minutes or longer.

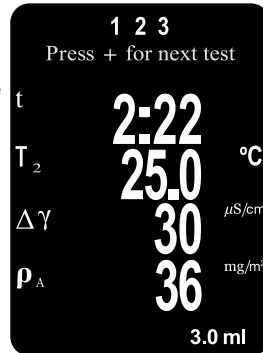**c)** After the desired amount of time has elapsed, withdraw the water from the patch.

d) To complete the measurement, completely fill the **PosiTector SST** probe's test cell with the water from the patch. Wait until the measurement stabilizes (up to 5 seconds), then press the ⊕ button to save the temperature **(T_2)** and conductivity **(γ_2)** of the solution. **Δγ**, the difference between the γ_2 soluble salt reading and the γ_1 background reading, is displayed.

t = test duration

T_2 = sample temperature

Δγ = The change in conductivity. The initial background measurement (γ_1) is automatically subtracted from the final measurement (γ_2). Test results are displayed in units of microsiemens per centimeter (conductivity).

ρ_A =The surface density of soluble salt expressed as sodium chloride. Test results are displayed in units of milligrams per square meter, or micrograms per square centimeter.

```
          1 2 3
      Press + for next test

t
          2:22
T 2       25.0        ºC

Δγ        30         µS/cm

ρ A       36         mg/m²

               3.0 ml
```

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If a memory batch is open, the measurement result will be stored in memory (pg. 11).

e) Press the ⊕ button to begin a new test.

Patch Removal
The **Bresle Method DeFelsko Patch** peels off the surface easier and with less residue than conventional Bresle patches. Remove it immediately after the test and dispose.

The **Bresle Method PosiPatch** lifts cleanly off the surface, with absolutely no residue. The user may choose to discard the PosiPatch and begin the next test with a new one, or simply rinse it with DI water and reuse for several more tests until worn.
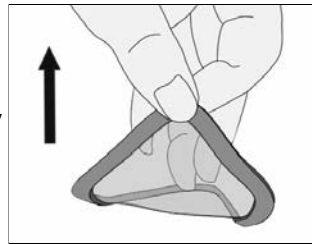
Rinsing the Test Cell
Rinse the test cell with unused DI water several times after each measurement, shaking the water out after each rinse.

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Calibration and Verification

Two steps ensure best accuracy…

1. **Calibration:** typically performed by the manufacturer. All probes include a Certificate of Calibration.

2. **Verification of Accuracy:** typically performed by the user by measuring known reference standards such as the supplied conductivity standard.

Calibration - Calibration is the high-level, controlled and documented process of measuring traceable calibration standards over the full operating range of the probe, and verifying that the results are within the stated accuracy of the probe. Calibrations are performed by the manufacturer, their authorized agent, or by an accredited calibration laboratory in a controlled environment using a documented process

Verification of Accuracy - Verification is an accuracy check performed by the user with a solution of known conductivity. To perform a verification, ensure that the conductivity standard and instrument are at the same temperature. Remove any remaining DI water in the test cell by filling it with the conductivity standard, then inverting the test cell to empty it. Fill the test cell with the conductivity standard again. If the reading is not within the combined tolerance of the gage and conductivity standard, proceed to *Cleaning the Test Cell*, below.

Cleaning the Test Cell - If the Verification reading is outside the combined accuracy of the conductivity standard and gage, the probe may need to be cleaned by filling it with DI water and rubbing the walls of the cell with a supplied foam tip swab. Rinse with DI water several times before using the cell.

Verify accuracy at the beginning and the end of each work shift. During the work shift, if the Gage is dropped or suspected of giving erroneous readings, its accuracy should be re-verified.

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Setup Menu

Units

Allows the operator to change the displayed units for both Temperature (°C or °F) and Surface Density (mg/m^2 or μg/cm^2).

Reset

Reset (menu Reset) restores factory settings and returns the Gage to a known condition. The following occurs:

- All batches, stored measurements, batch names and screen captures are erased.
- Calibration adjustments are returned to factory settings.
- The last stored background measurement (γ_1) is erased.
- Menu settings are returned to the following:

Memory = OFF	**Bluetooth & Stream** = OFF
Bresle Mode = ON	**WiFi & Access Point** = OFF
Auto Dim = ON	**USB Keyboard & Stream** = OFF
Display = None	**BLE Keyboard** = OFF
Patch Volume = 3.0 ml	**Surface Density units** = mg/m^2
Hi Res = OFF	**Temperature units** = °C

Perform a more thorough **Hard Reset** as follows:

1. Power down the Gage and wait 5 seconds.

2. Simultaneously press and hold the ⊕ and ☰ buttons until the **Reset** symbol ↻ appears.

This returns the Gage to a known, "out-of-the-box" condition. It performs the same function as a menu **Reset** with the addition of:

- Bluetooth Pairing info is cleared.
- Menu settings are returned to the following status:

Flip Lock = OFF	**Language** = English
Backlight = Normal	**Battery Type** = Alkaline
Auto Sync .net = ON	**Bluetooth Smart** = OFF
Sound = Medium	**USB Drive** = ON
Touch = ON	

NOTE:

- Date, Time and WiFi settings are not affected by either **Reset**.

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Cal Adjust (Calibration Adjustment)

The **PosiTector *SST*** can be adjusted to a known conductivity standard. Use the ⊖ and ⊕ buttons to decrease/increase the displayed value to match the known conductivity of the standard.

NOTE: In typical use, a calibration adjustment should not be required. Before performing the adjustment, ensure that the **PosiTector *SST*** test cell has been thoroughly cleaned with DI water. Ensure that the conductivity standard and **PosiTector *SST*** test cell are at the same temperature.

Patch Volume

Set the volume of water being used for the test (3.0 ml default). Use the ⊖ and ⊕ buttons to decrease/increase the displayed value. The patch volume is used to calculate surface density.

Hi Res ✓

Increases the displayed Gage resolution as follows:

0.1 µS, 0 – 200 µS
1.0 µS, over 200 µS

NOTE: Gage accuracy is not affected.

Bresle Mode ✓

When checked (default), the Gage guides the user through a 3-step test process in accordance with ISO 8502-6. Uncheck **Bresle Mode** to use the **PosiTector *SST*** as a regular conductivity meter such as when testing abrasive materials in accordance with ISO 11127-6 and ASTM D4940-15.

Sound

Adjusts the volume of built-in speaker (Off, Low, Medium, High).

Flip Lock ✓

Disables the **Auto Rotate** feature by locking the display in its current orientation.

Touch ✓

Allows the touch screen functionality to be disabled. All gage functions can also be controlled using the navigation buttons.

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Set Clock

All measurements are date and time stamped (24-hour format) when stored into memory. It is therefore important to set the correct date and time. Use the ▲ and ▼ buttons to select a value, and the ⊖ and ⊕ buttons to adjust it. The current date and time setting can also be viewed at the top of the main menu.

Battery Type

Selects the type of batteries used in the Gage from a choice of "Alkaline", "Lithium" or "NiMH" (nickel-metal hydride rechargeable). The battery state indicator symbol is calibrated for the selected battery type. No damage will occur if the battery type used in the Gage does not match the selected battery type.
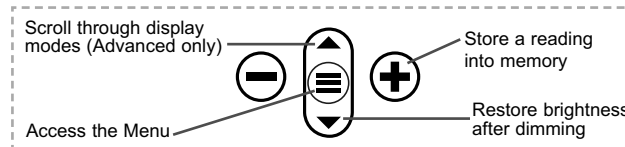
Memory Management

The **PosiTector** *SST* has internal memory storage for recording measurement data. Stored measurements can be reviewed on-screen or accessed via computers, tablets and smart phones. All stored measurements are date and time-stamped.

The 🖫 symbol appears when the Gage is set to store measurement data.

**Standard models** store up to 1,000 readings in one batch.

**Advanced models** store 250,000 readings in up to 1,000 batches. "New Batch" closes any currently opened batch and creates a new batch name using the lowest available number. New batch names are date-stamped when they are created.

Scroll through display modes (Advanced only)

Store a reading into memory

Access the Menu

Restore brightness after dimming

Screen Capture
Press both ⊖ and ⊕ buttons simultaneously to save an image of the current display. The last 100 screen captures are stored in memory and can be accessed when connected to a computer (see **PosiSoft USB Drive** pg. 12).

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Accessing Stored Measurement Data

DeFelsko offers the following free solutions for viewing, analyzing and reporting data:

PosiSoft USB Drive - Connect the Gage to a PC/Mac using the supplied USB-C cable. View and print readings and graphs using universal PC/Mac web browsers or file explorers. No software or internet connection required.

PosiSoft Desktop - Powerful desktop software (PC/Mac) for downloading, viewing, printing and storing measurement data. Includes a customizable, templated PDF Report Generator. No internet connection required.

PosiSoft.net - Web-based application offering secure, centralized storage of measurement data. Access your data from any web-connected device.

PosiTector App - (*Advanced models only)* App for compatible iOS and Android smart devices. Permits users to create, save and share professional PDF reports. Add images and notes using the smart device's camera and keyboard.

Connect Menu

WiFi   *(Advanced models only)*

Allows connection to your local wireless network or mobile hot spot. Ideal for using your network's internet connection synchronizing stored measurements with PosiSoft.net (above).

USB

When **USB Drive** is enabled   , the PosiTector uses a USB mass storage device class which provides users with a simple interface to retrieve stored data in a manner similar to USB flash drives and digital cameras. **USB Drive** is also required to import stored measurements into **PosiSoft Desktop** software (above).

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NOTE: When connected, power is supplied through the USB-C cable. The batteries are not used and the body will not automatically power down.

Keyboard *(Advanced models only)*

When enabled and connected to a computer, the PosiTector will be recognized as a *Keyboard*. Readings are sent to the computer as they are taken, emulating keystrokes, followed by a carriage return.

Stream *(Advanced models only)*

Stream individual readings to a USB connected computer via a serial protocol. Ideal for use with serial compatible SPC data collection software.

NOTE: _____

Sync .net Now

The above **WiFi** and **USB** menus contain a **Sync .net Now** option. When selected, the Gage immediately synchronizes stored measurement data via its respective communication method (internet connection required). Alternatively, select **Auto Sync .net** from within the **USB** connect menu to automatically synchronize upon connection to a PC. Additional measurements added to memory while connected are synchronized only when the USB cable is disconnected and reconnected, or when the **Sync.net Now** option is selected. **WiFi** connected gages automatically attempt synchronization upon power-up.

PosiSoft Desktop is required when using USB to synchronize measurements with *PosiSoft.net*.

Bluetooth *(Advanced models only)*

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Bluetooth Smart *(Advanced models only)* Bluetooth®

Allows communication with a smart device running the **PosiTector App** (pg. 12) via auto-pairing **Bluetooth Smart** (BLE) wireless technology.

Sync Batches

Select batches to flag them for synchronization to the PosiTector App. **Sync Batches** is useful when connecting a new device to a gage with pre-existing batches, since only batches created while **Bluetooth Smart** is enabled are automatically selected.

Selected batches are synchronized when the next reading is taken in a batch flagged for synchronization, or when the **Sync Batches** option is selected at the bottom of the list of selected batches.

NOTE: If **Bluetooth Smart** is disabled or disconnected, data from batches selected in the **Sync Batches** menu are held in a queue until communication with the PosiTector App is re-established.

Send Batches

Transfers selected batches to the PosiTector App. **Send Batches** is useful when switching between devices, as only readings and batches that have yet to be synchronized with any smart device are synchronized automatically.

The **Send Batches** option is visible in the menu when the Gage is connected to a smart device running the PosiTector App.

BLE Keyboard *(Advanced models only)*

When enabled and connected to a computer, the PosiTector will be recognized as a wireless **Keyboard**. Readings are sent to the computer as they are taken, emulating keystrokes, followed by a carriage return.

WARNING: The Gage will perform a **Hard Reset** after an update (see pg. 9).

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Returning for Service

Before returning the instrument for service…

1. Install new or newly recharged batteries in the proper alignment as shown within battery compartment.

2. Examine the probe for damage. Use the supplied cleaning tool to clear dirt or debris from the test cell.

3. Perform a **Hard Reset** (pg. 9).

4. If issue is not resolved, **Update** (pg. 14) your **PosiTector** gage body and re-attempt measurements.

Limited Warranty, Sole Remedy
and Limited Liability

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